CLAIMS

We claim:

1. A method for tuning scintillation detectors, comprising:

equalizing an output of a first light with an output of a neighboring, second light, the outputs being measured by one or more light detectors shared by the first and second lights; and

equalizing outputs of a plurality of light detectors using the equalized output of the first light.

2. The method of claim 1, the first and second lights comprising light from optical fibers coupled to a LED.

3. The method of claim 1, the light detectors comprising photomultiplier tubes (PMTs).

4. The method of claim 1, the first and second lights comprising LEDs.

5. The method of claim 4, equalizing the output of the first light comprising adjusting a pulse width or pulse amplitude input of a first LED.

6. The method of claim 5, the pulse width or pulse amplitude used for equalizing the output of the first LED being stored in a memory.

7. The method of claim 6, equalizing outputs of the plurality of light detectors comprising equalizing outputs of *n* light detectors surrounding the first LED.

8. The method of claim 7, the *n* light detectors being in a sector-sharing arrangement.

9. The method of claim 8, further comprising applying a sector-sensitivity correction factor to the pulse width or pulse amplitude to generate the equalized output of the first LED.

10. The method of claim 9, wherein the sector-sensitivity correction factor is generated from a sector-lookup table.

11. The method of claim 7, wherein n is 4.

12. The method of claim 7, wherein n is 6.

13. The method of claim 1, equalizing the outputs of the plurality of light detectors comprising adjusting gains of the light detectors.

14. The method of claim 13, adjusting gains comprising adjusting gains of variable-gain amplifiers coupled to the light detectors.

15. The method of claim 1, the first light having a symmetrical pulse-height energy distribution spectrum, and equalizing the outputs of the plurality of light detectors being performed using two registers, a first register counting events above a reference and a second register counting events below the reference.

16. The method of claim 1, further comprising establishing a reference output for one or more of the plurality of light detectors.

17. The method of claim 16, establishing a reference output comprising using an independent light detector or a temperature-stable light.

18. The method of claim 16, establishing a reference output comprising using a radioactive source as a reference.

19. The method of claim 18, the radioactive source comprising a radioactive source injected into a patient.

20. The method of claim 1, further comprising generating a trigger signal for initiating the integration of a gamma ray or a light signal.

21. The method of claim 20, wherein the trigger signal is generated by a pulser of a LED.

22. The method of claim 20, wherein the trigger signal is synchronized with a pulser of a LED.

23. The method of claim 1, further comprising equalizing outputs of a plurality of light detectors using the output of the neighboring, second light.

24. The method of claim 1, further comprising selecting a reference light detector.

25. The method of claim 24, wherein the reference light detector is selected from an equalization log.

26. A method for tuning light detectors, comprising:

equalizing outputs of a first plurality of light detectors using the output of a first light;

equalizing an output of a second light with the output of the first light, the second light neighboring the first light and the outputs of the first and second lights being measured by one or more shared light detectors; and

equalizing outputs of a second plurality of light detectors using the equalized output of the second light.

27. The method of claim 26, the first and second lights comprising light from optical fibers coupled to a LED.

28. The method of claim 26, the first and second lights comprising LEDs.

29. The method of claim 26, the light detectors comprising photomultiplier tubes (PMTs).

30. The method of claim 26, the equalizing of the output of the second light comprising adjusting a pulse width or pulse amplitude input of a second LED.

31. The method of claim 30, the pulse width or pulse amplitude used for equalizing the output of the second LED being stored in a memory.

32. The method of claim 31, the equalizing outputs of the second plurality of light detectors comprising equalizing outputs of *n* light detectors surrounding the second LED.

33. The method of claim 32, the *n* light detectors being in a sector-sharing arrangement.

34. The method of claim 33, further comprising applying a sector-sensitivity correction factor to the pulse width or pulse amplitude to generate the equalized output of the second LED.

35. The method of claim 34, wherein the sector-sensitivity correction factor is generated from a sector-lookup table.

36. The method of claim 32, wherein *n* is 4.

37. The method of claim 32, wherein *n* is 6.

38. The method of claim 26, the equalizing the outputs of the plurality of light detectors comprising adjusting gains of the light detectors.

39. The method of claim 38, adjusting gains comprising adjusting gains of variable-gain amplifiers coupled to the light detectors.

40. The method of claim 26, the second light having a symmetrical pulse-height energy distribution spectrum, and equalizing the outputs of the second plurality of light detectors being performed using two registers, a first register counting events above a reference and a second register counting events below the reference.

41. The method of claim 26, further comprising establishing a reference output for one or more of the light detectors.

42. The method of claim 41, establishing a reference output comprising using a radioactive source as a reference.

43. The method of claim 42., the radioactive source comprising a radioactive source injected into a patient.

44. The method of claim 41, establishing a reference output comprising using an independent light detector or a temperature-stable light.

45. An apparatus, comprising:

a first light neighboring a second light;

one or more PMTs shared by the first and second lights;

a pulser with programmable pulse width or pulse height coupled to the lights;

a data acquisition computer coupled to the pulser and configured to control the pulser to adjust a pulse width or pulse height of the second light so that its light

output is equalized with a light output of the first light.

46. The apparatus of claim 45, wherein the first and second lights comprising LEDs.

47. The apparatus of claim 45, wherein the first and second lights comprising optical fibers coupled to a LED.

48. The apparatus of claim 45, the PMTs being in a quadrant-sharing arrangement.

49. An apparatus, comprising:

means for equalizing outputs of a plurality of lights; and

means for equalizing outputs of a plurality of light detectors using the outputs of the plurality of lights.